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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,221	04/02/2004	Takayuki Nakamoto	43888-310	7325

7590 05/26/2009

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EXAMINER	
CHUO, TONY SHENG HSIANG	
ART UNIT	PAPER NUMBER
1795	
MAIL DATE	DELIVERY MODE
05/26/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/816,221	NAKAMOTO ET AL.	
	Examiner	Art Unit	
	Tony Chuo	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-4,6,7 and 9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-4,6,7 and 9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Claims 2-4, 6, 7, and 9 are currently pending. Claims 1, 5, 8, and 10-12 are cancelled. Applicant's arguments, see Remarks, pages 1-3, filed 3/2/09, with respect to claims 2-4, 6, 7, and 9 have been fully considered and are persuasive. The previous 103 rejections of claims 1-4 and 6-9 have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Fukui et al (JP 2002-075332).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 2-4, 6, 7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukui et al (JP 2002-075332) in view of Tarui et al (JP 2003/077529), and further in view of Yamamoto et al (US 2003/0054249).

The Fukui reference discloses a lithium secondary battery including a negative electrode active material capable of absorbing/desorbing lithium comprising a silicon alloy, wherein the silicon alloy is prepared by a method of liquid quenching and gas

atomizing, and wherein the negative electrode active material is in the form of a thin film (See paragraph [0017],[0023]).

Examiner's note: It is contended by the examiner that Fukui teaches a process of forming a silicon alloy that is similar to the process described on page 23 of the specification of the present invention. Specifically, the process of melting the particles and then cooling the mixture in Ar atmosphere by atomization is similar to the Fukui process of liquid quenching and gas atomizing. Therefore, it is inherent that the Fukui negative electrode active material contains a Si phase and an alloy phase containing Si and one other element because both silicon alloys were made by a similar process.

However, Fukui et al does not expressly teach an alloy containing Si and at least one element selected from the group consisting of Ti, Co, Mg, Zr, V, Mo, W, Mn, and Fe. The Tarui reference discloses a negative electrode active material for a lithium secondary battery that is capable of absorbing/desorbing lithium comprising an alloy mainly containing silicon and an element selected from the group consisting of Ti, Co, Zr, V, Mo, W, Mn, and Fe (See Abstract and paragraph [0018]).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Tarui et al indicates that an alloy mainly containing silicon and an element selected from the group consisting of Ti, Co, Zr, V, Mo, W, Mn, and Fe is a suitable material for use as negative electrode active material for a lithium secondary battery. The selection of a known material based on its suitability for its intended use has generally been held to be *prima facie* obvious (MPEP §2144.07). As such, it would be obvious to use an alloy mainly

containing silicon and an element selected from the group consisting of Ti, Co, Zr, V, Mo, W, Mn, and Fe.

However, Fukui et al as modified by Tarui et al does not expressly teach a surface layer comprising silicon oxide of 0.2 to 1,000 nm in average thickness formed on the inner layer, wherein the average thickness of the surface layer is 1 to 100 nm, wherein the average thickness of the surface layer is 1 to 10 nm, and wherein the surface layer has a thickness in the range of ± 50% of the average thickness. The Yamamoto reference discloses a silicon oxide film "5b" that is formed on an anode layer "3b", wherein the silicon oxide film has a thickness of 1.6 nm (See paragraph [0100],[0101], [0105]). Examiner's note: it is inherent that the silicon oxide film formed by vapor deposition would have a thickness in the range of ± 50% of the average thickness since it is well known in the art that the vapor deposition process forms a very uniform layer (See paragraph [0101]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Fukui/Tarui battery to include a surface layer comprising silicon oxide formed on the inner layer, wherein the surface layer has a thickness of 1.6 nm, and wherein the surface layer has a thickness in the range of ± 50% of the average thickness in order to reduce an anode potential during discharging that results in an increase in a battery operating voltage and to reduce the hydrofluoric acid level in the electrolyte which decreases the resistance within the battery by preventing positive ions in the cathode from eluting or LiF from forming on the anode surface excessively (See paragraphs [0093],[0100],[0111]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717. The examiner can normally be reached on M-F, 9:00AM to 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

/Jonathan Crepeau/
Primary Examiner, Art Unit 1795